

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue. The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Chase's Pipe Cutting & Threading Machine. Send for circular. Chase Machine Co., 120 Front St., New York.

Best Turkey Emery in bbls., kegs, and cases. Special rates for large quantities. Greene, Tweed & Co., N. Y.

J. F. Tallant, Engineer, Burlington, Iowa, makes a specialty of saving fuel and increasing power of defective boilers and engines.

The steam pipes, boilers, etc., of Messrs. Dunham, Buckley & Co., A. T. Stewart & Co., and S. Shethar & Co., are protected with H. W. Johns' Asbestos Boiler Coverings. H. W. Johns Manufacturing Company, No. 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos Liquid Paints, Roofing, etc.

Blake's Belt Studs. The most durable fastening for rubber and leather belts. Greene, Tweed & Co., N. Y.

Ice Machines selected. Information on all kinds. Benjamin's Sci. Expert Office, 37 Park Row, New York.

Hydraulic Jacks and Presses. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

The best article (because it is common sense) we have read on the subject of high and advancing prices, appears in the editorial department of Baldwin's Monthly, just published for February. We say to every one of our readers, get a copy and read it. Baldwin the Clothier is the sole editor.

For Sale at a great sacrifice if sold soon. Half interest in Machine and Repair Shop. Inquire of "Machinist," Box 92, Farmington, Iowa.

Wanted—A Drill Press, a Bolt Forging and Heading Machine, and a Pulley Lathe, of some new and improved pattern. Good second-hand machines might answer. Address Columbus Iron Works Company, Columbus, Ga.

Wanted.—English Iron Farm Gates. Howard, Pikesville, Md.

Mfrs of Physical, Optical, and Electrical Apparatus, also makers of small machinery and tools, send catalogues and price lists to G. M. H., Box 778, N. Y. city.

A Rare Chance.—We have on hand a 40 H. P. Horizontal Oscillating Engine, built for special work, but never used. It is first-class in all respects; has patent guides to prevent wear; has balance wheel, but no pulley. Price \$350. Heald, Sisco & Co., Baldwinville, N. Y.

New Inventions examined and tested. Designs and improvements. Reports for investors. Recipes and information on all industrial processes. Benjamin's Sci. Expert Office, 37 Park Row, New York.

For Sale.—One Wood Turning Lathe, 20' swing, 14 ft. bed. Jig Saw and Face Lathe, for pattern work; also Blacksmiths' Tools. D. Frisbie & Co., New Haven, Conn.

Campbell's Self-acting Window Shade Rollers are the best in the market. Models and terms to the trade, 85 Centre St., New York.

Wanted—A Machinist of experience, competent to superintend a large manufactory. Address, with references, in full, F. Case, Box 337, Cincinnati, O.

Small High Speed Steam Yachts complete or in parts. Geo. F. Shedd, Waltham, Mass.

Forsyth & Co., Manchester, N. H., & 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Electrical Indicators for giving signal notice of extremes of pressure or temperature. Costs only \$20. Attached to any instrument. T. Shaw, 915 Ridge Ave. Phila.

Partner Wanted.—See advertisement on inside page.

Models made to order. H. B. Morris, Ithaca, N. Y.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 61.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Collection of Ornaments.—A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent post free on receipt of \$2. Palm & Fechteler, 403 Broadway, New York city.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa.

To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Wright's Patent Steam Engine, with automatic cut-off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y. Bradley's cushioned helve hammers. See illus. ad. p. 77.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hogsheaf Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Sheet Metal Presses. Ferracite Co., Bridgeton, N. J.

Solid Emery Vulcanite Wheels.—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by P. A. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 61.

For Machine Knives and Parallel Vises, see advertisement, p. 61. Taylor, Styles & Co., Riegelsville, N. J.

Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Forges, for Hand or Power, for all kinds of work. Address Keystone Portable Forge Co., Phila., Pa.

Latest improved methods for working hard or soft metals, grinding long knives, tools, etc. Portable Chuck Jaws and Diamond Tools. Address American Twist Drill Co., Woonsocket, R. I.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Millstone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., New York.

Sawyer's Own Book, Illustrated. Over 100 pages of valuable information. How to straighten saws, etc. Sent free by mail to any part of the world. Send your full address to Emerson Smith & Co., Beaver Falls, Pa.

Eclipse Portable Engine. See illustrated adv., p. 94.

Repairs to Corliss Engines a specialty. L. B. Flinders Machine Works, Philadelphia, Pa.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus' ad. v. 62.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

Eagle Anvils, 9 cents per pound. Fully warranted.

The Horton Lathe Chucks; prices reduced 30 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn. \$275 Horizontal Engine, 20 H. P. See page 390.

Emery Wheels of all kinds, and Machines at reduced prices. Lehigh Valley Emery Wheel Co., Weissport, Pa.

Pat. Steam Hoisting Mach'y. See illus. adv., p. 93.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, Pa.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, send for catalogue to Rowley & Hermance, Williamsport, Pa.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Scheieher. Schumm & Co., Philadelphia, Pa. Send for circular.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 93.

The Twiss Automatic Cut-off; also Vertical and Yacht Engines. N. W. Twiss, New Haven, Conn.

NEW BOOKS AND PUBLICATIONS.

THE AMERICAN CHEMICAL JOURNAL.

The fifth number contains articles on the following subjects: On the Synthesis of Helicin and Phenol-Glucoside, by Arthur Michael; On a New Formation of Stilbene and some of its Derivatives, by Arthur Michael; On a New Method for the Separation and Subsequent Treatment of Precipitates in Chemical Analysis, by F. A. Gooch; On several Spanish Minerals, by F. A. Genth, Jr.; A Method for Estimating Bismuth Volumetrically, by M. Kuhara; New Results in Electrolysis, by Edgar F. Smith; Nitrosulphobenzoic Acids and some Derivatives, by Edward Hart. Professor Mallet continues his Brief Review of the most important Changes in the Industrial Applications of Chemistry within the last few Years, and a Report on Progress in Analytical Chemistry is continued by H. N. Morse. A variety of useful notes complete the number.

EXPERIMENTS ON THE STRENGTH OF WROUGHT IRON AND OF CHAIN CABLES. By Commander L. A. Beardslee, U. S. N. Revised and abridged by William Kent, M. E. New York: John Wiley & Son, Svo. pp. 119.

An abridgment of Commander Beardslee's voluminous and valuable report published by the United States Government last year.



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

Whenever you request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) T. asks: How many cells of Callaud battery will be required to do light silver plating? A. If you use a striking bath you will need eight or ten cells. Brass, copper, and German silver articles may be silvered with a single cell.

(2) C. E. H. asks: 1. Do you know of anything that may be added to the gelatine and glycerine, that forms the copying pad described in the SCIENTIFIC AMERICAN, that will make it more tenacious and not injure its copying properties, as with the ingredients given parts of the pad sometimes adhere to the paper used in copying? A. Heat the composition for several hours over a water bath to expel as much of the water (used in softening the glue) as possible. Then let stand several hours in a cool place to harden. If re-

quired to be used in a hot room, add more glue and, say 5 per cent, of alum to the composition. 2. Are there other preparations used for this purpose? A. There are several similar compositions in use.

(3) P. G. R. asks: If a solution be made with pure gold, nitric and muriatic acids, can the acids be drawn off leaving the gold in a powdered state; if so, how? A. Evaporate the solution, nearly to dryness in a porcelain lined iron vessel over the waterbath, to expel excess of acids; redissolve the residue in warm water, mix with 10 per cent of oxalic acid, and let stand over night. Or add to the aqueous solution 20 per cent of pure copperas (sulphate of iron) dissolved in a small quantity of warm water. Let the precipitated gold, which in the latter case is of a dull brownish color, settle, carefully decant the solution, and heat the powder to low redness.

(4) J. W. C. asks: 1. Is bay rum injurious when applied, without reducing, to the hair? A. In moderation, no. 2. Can you tell me why the bay rum which I diluted a short time ago with warm water, immediately assumed a milky white appearance and so remained, utterly devoid of the usual odor given out by good bay rum? A. It is due chiefly to the insolubility in water of the essential oils contained in the spirit. Use dilute spirit instead of water.

(5) T. S. B. asks: What is the best cement that can be used to cement a glass tube into a mercury reservoir made of iron for a pressure column at 60° pressure (and less)? In the one we have put up the mercury oozes through the pores of the plaster of Paris with which we have made the joint to connect the glass tube with the bell end of iron reservoir. A. Better adapt the surfaces by grinding; use a rubber washer and small screw clamp collar, resting on a shoulder blown in the glass. For ordinary purposes a good rubber stopper, cleanly perforated to admit the tube, will answer very well. Cements cannot be depended on in this connection.

(6) F. T. asks how the coppermiths retain their old copper saucapans and have them look so bright inside. We do a considerable of this kind of work, but are unable to give them a bright color inside. A. Thoroughly cleanse by means of dilute sulphuric acid, or hydrochloric acid nearly saturated with zinc (acid zinc chloride), and moist purine powder; if necessary, rinse. Warm the pan, pour in a small quantity of grain tin, melted in a ladle, and a little rosin powder; quickly brush this about with a brush made of a bunch of hemp, so as to bring the fused metal in contact with every part of the surface to be tinned. The pot or pan must be kept hot enough to prevent the tin from solidifying. As soon as the parts are properly coated, pour out the excess of melted metal, invert, and remove the selvage by means of the brush.

(7) A. W. H. writes: I have made a copying pad as per instructions in No. 21, Vol. xii., and it worked splendid first time, having taken one hundred and two good, legible impressions from one copy. Please say if an ink can be made to be used on stereotype plates and wood cuts (and not injure them) to be transferred to paper and from there to the pad, same as the ink you give directions for in above number. A. We have not experimented in this direction. Probably such an ink could be made. Have you tried a clear, saturated aqueous solution of 3B methylviolet with and without glycerine?

(8) M. H. G. asks: 1. In the plan of the "Sharpie" in the SUPPLEMENT, what is the distance on the bottom inside from deadwood to forward end of centerboard? A. The distance, 13 1/2 feet, is given by the builder. 2. What are the dimensions of the keelson? A. The same thickness as the keel and somewhat deeper. 3. How should it be fastened to the bottom? A. Fasten through and through with rivets. 4. Am I to understand that three inches is the width of centerboard? I should not think it wide enough. I never saw one so narrow. A. 3 inches is correct.

(9) G. & B. ask: What will protect iron from sulphuric acid? Will liquid glass answer, if applied often? A. No; try a thick coating of genuine asphaltum varnish. Let it harden thoroughly before using.

(10) C. W. H. asks (1) whether in testing with tannic acid for impurity in water, the presence of the bicarbonates of sodium or calcium would affect the analysis, and if so, how. A. Heat the water, cool and filter before adding the tannin, if the water contains any considerable quantity of free carbonic acid or bicarbonates. 2. How can I test mineral spring water to detect impurities if they exist? A. Consult Wanklyn and Chapman's "Water Analysis." See also back numbers of the SCIENTIFIC AMERICAN on this subject.

(11) A. E. K. writes: I have made copying pad and ink does not start freely from the pen. A. Let settle, decant, and add a little alcohol.

(12) C. E. B. asks: 1. What chemical process can be used to keep water very cold? I have an airtight vessel that contains six gallons of water, and desire to keep it cold. A. See "Ice, Artificial," Johnson's or Appleton's Encyclopedias, Knight's "New Mechanical Dictionary," and the back numbers of the SCIENTIFIC AMERICAN SUPPLEMENT. 2. How long will it remain cold? A. It will depend upon the shape, size, material, surroundings, etc., of the vessel. Consult Tynall's "A Mode of Motion."

(13) G. W. G. asks: What would be the dimensions of a cylinder capable of driving a ten horse power engine? A. It depends upon the speed at which the engines are run; ordinarily about 8 inches cylinder "Heat as by 12 inches stroke.

(14) F. T. S. writes: 1. I have two glass jars, 4x7, and a zinc. Could I make a battery with zinc in one jar and copper in the other? A. No; the zinc and copper must be in the same jar. They may be separated by a porous cell, as in the Daniell, or they may be placed one over the other in the zinc above the copper, as in the gravity. See SUPPLEMENTS, 157, 158, and 159, on the construction and operation of batteries. 2. What weight copper will I need with reference to weight of zinc? A. The weight is immaterial, but the surface

should be as great as that of the zinc, and it is generally made greater. 3. What solution? A. Saturated solution of copper sulphate. 4. Will it move a sounder? A. Yes. 5. About how many feet of wire are there on sounder and relay magnets? A. Make the thickness of the wrapping equal to the diameter of the magnet core. The resistance of the relay should correspond with certain conditions of line battery, etc. 6. Will a sounder intended for short line work on a long line by winding more wire on the magnets? A. Within certain limits, but it is not a good idea. Better rewind the magnets with finer wire. 7. What is a relay used for? A. It is placed in a line for controlling a local circuit.

(15) A. P. B. asks: 1. What is the composition of the rubber used in making rubber hand stamps? A. Purified caoutchouc containing about 6 per cent of sulphur. 2. How is it melted before pouring into the mould? How is it prevented from adhering to the plaster, after cooling? A. It is not melted. See "How to Make Rubber Stamps," p. 1326, No. 83, SCIENTIFIC AMERICAN SUPPLEMENT. Also articles on vulcanizing rubber, pp. 48 and 105, Vol. 39, SCIENTIFIC AMERICAN.

(16) S. C. asks if there is a United States standard weight for a gallon of milk, and how much it is. All the milk here is sold by wine measure, 231 cubic inches to the gallon. I don't think it is right. I think in New York the milk is sold by beer measure, 282 cubic inches to the gallon. Am I right? A. 231 cubic inches is the standard gallon.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

H. W. V.—1. Hornblende, quartz, orthoclase, and calcite. 2. Graphite and hornblende. 3. Clay slate. 4. Syenite. 5. Silicious hematite. 6. Graphite in greenstone. 7. Marcasite. 8. Hematite. 9. Chiefly quartz rock. 10. Syenite with limonite.—Sample marked "geological specimens," an excellent variety of limonite, an ore of iron.—F. W. O.—The metal is antimony, probably worth 10 cents per pound in large quantities.—J. B. B.—It is jasper or chalcedony.

COMMUNICATIONS RECEIVED. On Fly Wheels. By C. T. S. On Railroad Crossings. By J. T. On Temperature of the Sun. By D. F. S. On a Theory of Cold and Mild Winters. By G. R. C.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week Ending

January 13, 1880, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, or any patent issued since 1867, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Table listing inventions and their patent numbers, including items like Accordion, Acid, manufacture of anhydrous sulphuric, J. A. W. Wolters, Aging liquors, apparatus for, J. C. Vetter, Axle box, vehicle, A. J. Robinson, Bale tie buckle, J. M. Thayer, Ball trap, I. A. Paine (r), Belt fastener, J. McGeorge, Berth guard for sleeping cars, E. A. McMann, Berth protector for sleeping cars, G. W. Farlee, Bit brace, A. H. Crockford, Bleaching solution of soda or potassa, preparing an aqueous, P. J. Austen, Boiler furnace, steam, C. F. Pike, Book holder, J. L. Highbarger, Boots and shoes, manufacture of, L. R. Blake (r), Bottle stopper, S. S. Newton, Bottle stopper and fastener, R. McCully, Braid pin, A. W. Williams, Brick machine, pressed, Z. Vamer, Brick, pottery, etc., kiln for burning, H. Escherich, Bucket, tub, etc., wooden, T. Richards, Jr., Buckle, trace, J. Lally, Butterpackage, J. Carpenter, Cane juice, appar. for bleaching, J. M. Lescale (r), Car coupling, F. Z. Hickox, Car frame, G. W. Cushing, Car wheel guard, railway, S. Brisac, Cars, propelling, O. H. Jadwin, Carbureter, H. C. De Witt, Cardboard, machine for cutting and scoring, Brombacher, Carriage, extension, H. C. Seely, Chart, dressmaker's, M. E. Riley, Churn, S. P. Mecay, Churn, H. A. Rideout, Clock, electric time registering, J. B. Johnson, Clock, time registering, E. Prescott, Cloth cutting knife, N. Rubenstein, Clothes pounder, Hewitt & Bennett, Coal culm for fuel, etc., preparing, C. Detrick, Cock, stop, C. H. Cushing, Cocks, machinery for grinding, J. L. Hayden, Commode, portable, W. S. G. Baker, Cot, R. Stilwell, Cotton chopper and cultivator, C. C. & A. G. Davis, Cotton picking shade, J. C. Benthal, Counter stiffeners, machine for shaping, L. Cote, Curtain roller, J. C. Lake, Damper regulator, automatic, F. A. Jones, Door bolt and check, combined, I. D. Bush, Dogr wicket, Stroud & Titus, Dress protector, E. S. Williams, Drier, Leidersdorf & Mendel, Drum, A. L. Fayaux, Easel for carriage painters, D. Warrington, Electric lighting, D. Flanery, Electric lighting apparatus, A. J. Martin, Electric machine, dynamo, Thomson & Houston, Elevator safety attachment, P. J. Schmitt, End board for wagon boxes, F. B. Graff, Eyebolts, machine for making, Briggs & Dougherty, Farm gate, D. C. Kissell.